the film seemingly has a single-crystal-like structure. Except for Ta forming the underlayer and the protective layer, all the layers constituting the film were in fcc(111) orientation. In the diffraction pattern, another spot was seen in the site spaced from the center point by a radius, R. This indicates the difference in the fcc(111) spacing size between IrMn and CoFe/Cu/CoFe. In the lattice images, highly ordered fcc(111) orientation was confirmed. Some lattice points were found discontinued in the lateral direction. In the entire region, the diffraction pattern gave a single spot. It is believed that the lattice discontinuity will be for sub-grain boundaries such as small angle tilt boundaries.

The single-crystal-like structure confirmed herein is favorable, since the film with the structure has good thermal stability for the MR ratio and the magnetic characteristics and since the structure has few intergranular boundaries that may cause electron scattering. In that structure, the mean free path of electrons is long, and the peak value of the MR ratio is increased. The technique of producing the film having such a single-crystal-like structure on an amorphous substrate such as thermally-oxidized silicon or amorphous alumina is one characteristic aspect of the invention. In this Example, used was a thermally-oxidized silicon substrate, which, however, is not imitative. The film formation according to the technique of the invention may also be effected on an amorphous

AlO_x film formed on an AlTiC substrate, or even on any other amorphous oxide films, amorphous nitride films or diamond-like carbon.

In the film of this Example, the underlayer for Au does not always need to be Ta. However, Au needs the subbing buffer layer of some type. Depositing Au directly on the thermally-oxidized silicon substrate does not give a single-crystal-like structure such as that in this Example. As other materials except Ta usable for subbing Au, mentioned are Ti, W, Zr, Mo, Hf and alloys comprising any of them. In the underlayer constitution of Ta/Au/Cu as herein, Ta and Au form an alloy. In this, therefore, island growth of Au is prevented, and the Au grains could easily undergo secondary growth. In other words, the bonding forth of the grains to the substrate stronger than the aggregation forth thereof has favorable influences on the film growth.

The subbing film constitution of Ta/Au/Cu is effective for promoting single-crystal-like growth of grains. As in this case, when the alloying materials are formed into a laminate film, Au grains to be formed into a film do not grow as they are on Cu but form single-crystal grains as their bonding forth to the underlayer is enlarged. The underlayer structure like herein could not be formed in a simple Ta/Cu underlayer such as that in 5 nanometer Ta/2 nm Cu/4 nm CoFe/3 nm Cu/2 nm CoFe/7 nm IrMn/5 nanometer Ta.

As other examples of good layer constitution, mentioned are laminate films or alloy films of Al-Cu, Pt-Cu, Rh-Cu, Pd-Cu, Ir-Cu, Ag-Pt, Ag-Pd, Ag-Au, Au-Pt, Au-Pd and Au-Al for Co-based magnetic layers, as in Example a. The number of layers for the laminate films is not limited, so far as two or more layers constitute one laminate film. For Ni-based magnetic layers, mentioned are laminate films or alloy films of Au-Pt, Au-Pd, Au-Ag, Au-Al, Ag-Pt, Ag-Pd, Ru-Rh, Ru-Ir and Ru-Pt. Like for Co-based magnetic layers, the number of layers for the laminate films is not also limited, so far as two or more layers constitutes one laminate film. Of the combinations of two metals, Au-Cu, Ag-Pt, Au-Pd, Au-Ag and Pt-Cu have a lot of latitude in their solid solution. Laminate films of Ru-Cu and Ag-Cu not forming solid solution could also be employed herein.

Other structures of the subbing film employable herein include Ta/Cu/Au/Cu, Ta/Pt/Cu, Ta/Cu/Pt, Ta/Rh/Cu, Ta/Cu/Rh, Ta/Pd/Cu, Ta/Cu/Pd, etc. In those, the number of the layers to be on the buffer layer of Ta may be increased. In place of Ta, any of Ti, W, Zr, Mo, Hf or alloys comprising them may also be used. It is desirable that the fcc metal layer moiety in the subbing film is not so thick if no element capable increasing resistance is added to the film. This is for the purpose of preventing the MR reduction to be caused by the increase in the shunt current in the spin valve films comprising